REMARKS

Claims 17 and 18 are rejected under 35 U.S.C. §102(e) as being anticipated by Kodialam et al. (US Patent No. 6,538,991). Claims 2-4, 6-8, and 10-12 are rejected under 35 U.S.C. §103(a) as being unpatentable over Benmohamed et al. (US Patent No. 6,795,399) in view of Mitra et al. (US Patent No. 6,721,270). Claims 14-16 are rejected under 35 U.S.C. §103(a) as being unpatentable over Benmohamed in view of Debey (US Patent No. 6,519,693).

By way of this amendment, claim 17 is amended to improve form. No new matter is added by way of this amendment. Claims 2-4, 6-8, 10-12, and 14-18 remain pending.

35 U.S.C. §102 Rejection

Claims 17 and 18 stand rejected under 35 U.S.C. §102(e) as allegedly anticipated by Kodialam. Applicant respectfully traverses the rejection.

Amended independent claim 17 is directed to a method comprising specifying, when designing a network, a boundary forming an area that includes a plurality of nodes making up the network, identifying a first one of the plurality of nodes that is proximate to the boundary as an ingress node to make incoming traffic available to other nodes in the network, identifying a second one of the plurality of nodes that is proximate to the boundary as an egress node to make outgoing traffic from the network available to the another network, identifying an incoming traffic rate for the ingress node, identifying an outgoing traffic rate for the egress node, determining paths from the ingress node to the egress node that carry the incoming traffic via at least a subset of the plurality of nodes, calculating link capacities for the determined paths, and determining traffic capacities for the at least the subset of the plurality of nodes using the

calculated link capacities. Kodialam does not disclose or suggest at least one of these features.

For example, Kodialam does not disclose or suggest specifying, when designing a network, a boundary forming an area that includes a plurality of nodes making up the network, as required by claim 17.

Kodialam is directed to a constraint-based routing method to determine a path through a network for a requested label-switched path (LSP) (abstract). The constraint-based routing method of Kodialam is implemented in a router to allow a network to account for delay to maintain QoS levels (col. 10, lines 32-39). Kodialam is not directed to a method including specifying, when designing a network, a boundary forming an area that includes a plurality of nodes making up the network, as recited in amended claim 17.

The Examiner alleges that Kodialam discloses the above feature at Fig. 3 and col. 5, lines 19-24. Applicant respectfully disagrees.

Fig. 3, of Kodialam, is directed to a network of interconnected nodes that employs a constraint-based routing method for routing network tunnel paths (col. 4, lines 35-37). The constraint-based method of Fig. 3 determines a path through network 300 for a request for a network tunnel path, such as a label-switched path (LSP) (col. 4, lines 53-55). This portion of Kodialam does not disclose or suggest specifying, when designing a network, a boundary forming an area that includes a plurality of nodes making up the network, as recited in amended claim 17.

Col. 5, lines 19-24, of Kodialam, recites:

> A network of interconnected nodes such as network 300 is defined as G(N, L, B), where N is the set of routers (nodes), L is the set of links (arcs), and B is the set of available resources for corresponding links in the set L (referred to herein as the set of link bandwidths, which may be residual bandwidths described below).

This portion of Kodialam is directed to a function (G) for defining a network of interconnected nodes as a function of a set of routers (N), a set of links (L) and a set of available resources for corresponding links in the set L (B). This portion of Kodialam does not disclose or suggest specifying, when designing a network, a boundary forming an area that includes a plurality of nodes making up the network, as recited in amended claim 17.

Since Kodialam does not disclose or suggest the features of claim 17, a 35 U.S.C. §102(e) rejection of claim 17 is improper. Applicant respectfully requests reconsideration and withdrawal of the 35 U.S.C. §102(e) rejection of claim 17 for at least the reasons presented above.

Claim 18 depends from claim 17 and is believed allowable for at least the reasons presented with respect to claim 17 above. Applicant respectfully requests that the 35 U.S.C. §102(e) rejection of claim 18 be reconsidered and withdrawn.

35 U.S.C. §103 Rejections

Claims 2-4, 6-8, and 10-12 are rejected under 35 U.S.C. §103(a) as being unpatentable over Benmohamed in view of Mitra. Applicant respectfully traverses the rejection.

Independent claim 3 is directed to a communication network designing circuit for multiple point communication service for permitting arbitrary communication within a predetermined range by providing traffic flowing in from an ingress node through which data flows in from another network and traffic flowing out from an egress node through which data is fed to the other network including setting means for setting a mathematical programming

problem for deriving the multiple point communication service to permit arbitrary communication within the predetermined range, the setting means including optimization reference generating means for setting an objective function for minimizing a link load in an object network coupled to the other network and serving as an optimization reference and setting a constraint expression for deriving the link load, per-user necessary link capacity calculating condition generating means for generating a constraint expression for calculating a necessary link bandwidth for each link carrying traffic flowing in from each ingress node, and link including condition generating means for generating a constraint expression so as not to exceed a link capacity limit in each link; and optimizing means for solving the mathematical programming problem set by the setting means and obtaining a path for the multiple point communication service. Benmohamed and Mitra, alone or in any reasonable combination, do not disclose or suggest at least one of these features.

For example, Benmohamed and Mitra, whether taken alone or in any reasonable combination, do not disclose or suggest setting means for setting a mathematical programming problem for deriving the multiple point communication service to permit arbitrary communication within the predetermined range, as required by claim 3. The Examiner alleges that Benmohamed discloses the above feature at col. 2, lines 5-10, Fig. 1, Fig. 2, col. 5, lines 12-23 and col. 7, lines 30-35 (Office Action, page 5). Applicant respectfully disagrees.

Col. 2, lines 5-10, of Benmohamed, recites:

> In a first aspect of the invention, methods and apparatus are provided for computing link capacity requirements of the links of the network. Particularly, upper and lower link capacity bounds are computable to provide the user of the design methodology with worst-case and optimistic results as a function of various design parameters.

This portion of Benmohamed discloses computing upper and lower link capacity bounds to

provide a user with worst-case and optimistic results as a function of various design parameters. Contrary to the Examiner's interpretation, col. 2, lines 5-10, of Benmohamed, does not disclose or suggest setting means for setting a mathematical programming problem for deriving a multiple point communication service to permit arbitrary communication within a predetermined range, as required by claim 3.

Figure 1, of Benmohamed, is directed to a block diagram of an IP network design system and Figure 2 is directed to a flow chart of a design methodology according to an embodiment of the invention (col. 2, lines 48-51). The network design system of Figure 1 is used to run an algorithm for computing worst case and optimistic link capacity requirements, optimizing a network topology and determining router placement in a network (abstract). The algorithm run in the network of Figure 1 is illustrated in Figure 2 and discussed at col. 5, lines 12-32.

Col. 5, lines 12-32, of Benmohamed, recites:

> Referring to FIG. 2, one embodiment of a general design algorithm 200 of the system proceeds as follows. First, the traffic mix F_l at each link is computed (by routing processor 12) based on an initial network topology G_s (from optimization processor 18) which is a subgraph of G, the routing algorithm R, the link metric vector l, and the set of IP demands F (step 202). Second, the capacity of each link required to satisfy the bandwidth demands in F_l is computed (by link capacity requirements processors 14 and 16) based on the type(s) of routers in the network, the different assumptions on congestion scenario, and in some cases the end-to-end delays of the TCP demands (step 204). Third, the design system determines whether the final network design (by optimization processor 18) is obtained (step 206). If not, in step 208, the network topology is perturbed (by optimization processor 18) and the new network cost is evaluated in accordance with steps 202 and 204. This design iteration is then repeated until the final network design is obtained. The results of the final design are output (step 210), e.g., in the form of information displayed to the user of the design system, including: (1) the vector C; (2) the route of each traffic flow f_i ; and (3) the corresponding network cost.

Neither Figure 2 nor portions of the specification discussing Figure 2 disclose features of claim 3. Therefore, contrary to the Examiner's interpretation, Figures 1 and 2 do not disclose or

suggest setting means for setting a mathematical programming problem for deriving a multiple point communication service to permit arbitrary communication within a predetermined range, as required by claim 3.

Col. 5, lines 12-23, of Benmohamed, recites:

> Referring to FIG. 2, one embodiment of a general design algorithm 200 of the system proceeds as follows. First, the traffic mix F_1at each link is computed (by routing processor 12) based on an initial network topology G_s (from optimization processor 18) which is a subgraph of G, the routing algorithm R, the link metric vector l, and the set of IP demands F (step 202). Second, the capacity of each link required to satisfy the bandwidth demands in F_1 is computed (by link capacity requirements processors 14 and 16) based on the type(s) of routers in the network, the different assumptions on congestion scenario, and in some cases the end-to-end delays of the TCP demands (step 204).

This portion of Benmohamed discloses computing a traffic mix for links in a network based on a network topology, routing algorithms, a link metric vector and a set of IP demands. Contrary to the Examiner's interpretation, this portion of Benmohamed does not disclose or suggest setting means for setting a mathematical programming problem for deriving the multiple point communication service to permit arbitrary communication within the predetermined range, as required by claim 3. In fact, this portion of Benmohamed does not even relate to a multiple point communication service.

Col. 7, lines 30-35, of Benmohamed, discloses an equation (Eq. 5) that may be used to represent a minimum link capacity capable of meeting all demands of a network. Contrary to the Examiner's interpretation, col. 7, lines 30-35, of Benmohamed, does not disclose or suggest a setting means for setting a mathematical programming problem for deriving a multiple point communication service to permit arbitrary communication within the predetermined range, as required by claim 3.

Mitra also does not disclose or suggest a setting means for setting a mathematical programming problem for deriving a multiple point communication service to permit arbitrary communication within the predetermined range, as required by claim 3.

Benmohamed and Mitra also do not disclose or suggest still other features of claim 3. For example, Benmohamed and Mitra do not disclose or suggest optimizing means for solving the mathematical programming problem set by the setting means and obtaining a path for the multiple point communication service, as further recited in claim 3. The Examiner alleges that Benmohamed discloses an optimizing means for solving the mathematical programming problem set by the setting means and obtaining a path for the multiple point communication service. The Examiner relies on Figures 1 and 2 and col. 5, lines 23-33 in support of the above allegation (Office Action, page 6). Applicant respectfully disagrees.

As previously discussed, Figures 1 and 2, of Benmohamed, are directed to a block diagram of an IP network design system (Figure 1) and to a flow chart of a design methodology according to an embodiment of the invention (Figure 2) (col. 2, lines 48-51). Contrary to the Examiner's interpretation of Benmohamed, Figures 1 and 2 do not disclose an optimizing means for solving the mathematical programming problem set by the setting means and obtaining a path for the multiple point communication service, as required by claim 3.

Col. 5, lines 23-33, of Benmohamed, recites:

> Third, the design system determines whether the final network design (by optimization processor 18) is obtained (step 206). If not, in step 208, the network topology is perturbed (by optimization processor 18) and the new network cost is evaluated in accordance with steps 202 and 204. This design iteration is then repeated until the final network design is obtained. The results of the final design are output (step 210), e.g., in the form of information displayed to the user of the design system, including: (1) the vector C; (2) the route of each traffic flow f_i; and (3) the corresponding network cost.

This portion of Benmohamed discloses perturbing a network topology if a final network design is not obtained. Contrary to the Examiner's interpretation, this portion of Benmohamed does not disclose or suggest an optimizing means for solving a mathematical programming problem set by the setting means and obtaining a path for the multiple point communication service, as required by claim 3. In fact, this portion of Benmohamed does not even relate to solving a mathematical programming problem or obtaining a path for a multiple point communication service.

The Examiner correctly notes that Benmohamed does not disclose an optimization reference generating means for setting objective function for minimizing a link load (Office Action, page 6). The Examiner alleges that Mitra discloses an optimization reference generating means for setting an objective function for minimizing a link load (Office Action, page 6). The Examiner points to Fig. 2, col.5, lines 45-67 and col. 6, lines 1-47 of Mitra in support of the above allegation (Office Action, page 6). Applicant disagrees with the Examiner's characterization of Mitra.

Mitra discloses allocating bandwidth to service routes in a QoS service class so as to optimize a figure of merit such as network revenue (abstract). Fig. 2 and col. 5, lines 45-67, of Mitra, disclose solving a multicommodity flow (MCF) problem (block 20) to find flows on respective service routes that maximize network QoS revenue. Col. 6, lines 1-47 further disclose aspects of solving the MCF problem. In particular, col. 6 discusses solving the MCF problem of block 20 (Fig. 2) to determine an optimal value of the total QoS network revenue (col. 6, lines 20-23). Mitra goes on to disclose, that an object of the MCF problem of block 25 (Fig. 2) is to minimize the total resource utilization by QoS traffic (col. 6, lines 33-37). In col. 6, Mitra discloses three summations taken over links, streams, and routes to obtain an objective function

which is minimized subject to a revenue constraint (col. 6, lines 40-47). Minimizing an objective function subject to a revenue constraint using a triple summation, of which one summation is over links, is not the same as an optimization reference generating means for setting an objective function for minimizing a link load in an object network, as required by claim 3. For at least these reasons, Mitra does not teach this feature of claim 3.

Since Benmohamed and Mitra, alone or in any reasonable combination, do not disclose or suggest the combination of features of claim 3, the 35 U.S.C. §103(a) rejection of claim 3 is improper. Applicant respectfully requests that the 35 U.S.C. §103(a) rejection of claim 3 be reconsidered and withdrawn.

Claims 2 and 4 depend from claim 3 and are believed allowable for at least the reasons presented with respect to the 35 U.S.C. §103(a) rejection of claim 3. Reconsideration and withdrawal of the 35 U.S.C. §103(a) rejection of claims 2 and 4 is respectfully requested.

Claim 7 is directed to a communication network designing method for multiple point communication service for permitting arbitrary communication within a predetermined range by providing traffic flowing in from an ingress node through which data flows in from another network and traffic flowing out from an egress node through which data is fed to the other network, including setting a mathematical programming problem for deriving the multiple point communication service to provide arbitrary communication within the predetermined range, the setting including setting an objective function for minimizing a link load in an object network operatively coupled to the other network and where the objective function serves as an optimization reference, setting a constraint expression for deriving the link load, generating a constraint expression for calculating a necessary link bandwidth of each link carrying traffic

flowing in from each ingress node, and generating a constraint expression so as not to exceed a link capacity limit in each link; solving the mathematical programming problem set by the setting; and obtaining a path for the multiple point communication service. Benmohamed and Mitra, alone or in any reasonable combination, do not disclose or suggest at least one of the features of claim 7.

For example, Benmohamed and Mitra, alone or in any reasonable combination, do not disclose or suggest setting a mathematical programming problem for deriving the multiple point communication service to provide arbitrary communication within the predetermined range, as required by claim 7. The Examiner alleges that Benmohamed discloses this feature at col. 2, lines 5-10, Fig. 1, Fig. 2, col. 5, lines 12-23, and col. 7, lines 30-35 (Office Action, page 8). As discussed in connection with independent claim 3, above, col. 2, lines 5-10, Fig. 1, Fig. 2, col. 5, lines 12-23, and col. 7, lines 30-35 do not disclose or suggest setting a mathematical programming problem for deriving the multiple point communication service to provide arbitrary communication within the predetermined range. As further discussed in connection with claim 3, above, the disclosure of Mitra does not cure the deficiency of Benmohamed with respect to setting a mathematical programming problem for deriving the multiple point communication service to provide arbitrary communication within the predetermined range.

Since Benmohamed and Mitra, alone or in any reasonable combination, do not disclose or suggest the features of claim 7, the 35 U.S.C. §103(a) rejection of claim 7 is improper. Applicant respectfully requests that the 35 U.S.C. §103(a) rejection of claim 7 be reconsidered and withdrawn.

Claims 6 and 8 depend from claim 7 and are believed allowable for at least the reasons

presented with respect to the 35 U.S.C. §103(a) rejection of claim 7. Reconsideration and withdrawal of the 35 U.S.C. §103(a) rejection of claims 6 and 8 is respectfully requested.

Claim 11 is directed to a storage medium storing a communication network design control program for designing a communication network for multiple point communication service for permitting arbitrary communication within a predetermined range by providing traffic flowing in from an ingress node through which data flows in from another network and traffic flowing out from an egress node through which data is fed to the other network, the communication network design control program including setting a mathematical programming problem for deriving the multiple point communication service to provide arbitrary communication within the predetermined range, the setting including setting a constraint expression for deriving a link load, generating a constraint expression for selecting a route for traffic flowing in from the other network, generating a constraint expression for calculating a necessary link bandwidth of each link carrying traffic flowing in from each ingress node, and generating a constraint expression so as not to exceed a link capacity limit in each link; solving the mathematical programming problem set in the setting step; and obtaining a path for the multiple point communication service. Benmohamed and Mitra, alone or in any reasonable combination, do not disclose or suggest at least one of these features.

For example, Benmohamed and Mitra do not disclose or suggest setting a mathematical programming problem for deriving the multiple point communication service to provide arbitrary communication within the predetermined range, as required by claim 11. As discussed in connection with claims 3 and 7, above, Benmohamed does not disclose or suggest this feature. The Examiner does not rely on Mitra for curing the shortcomings of Benmohamed with respect

to claim 11; however, even if the Examiner were to apply Mitra to claim 11, Mitra provides nothing to cure the defects in the disclosure of Benmohamed with respect to setting a mathematical programming problem for deriving the multiple point communication service to provide arbitrary communication within the predetermined range. Therefore, a combination of Benmohamed and Mitra would not constitute a valid 35 U.S.C. §103(a) rejection of claim 11.

Since Benmohamed, alone or in combination with Mitra, does not disclose or suggest the features of claim 11, the 35 U.S.C. §103(a) rejection of claim 11 is improper. Applicant respectfully requests that the 35 U.S.C. §103(a) rejection of claim 11 be reconsidered and withdrawn.

Claims 10 and 12 depend from claim 11 and are believed allowable for at least the reasons presented with respect to the 35 U.S.C. §103(a) rejection of claim 11. Reconsideration and withdrawal of the 35 U.S.C. §103(a) rejection of claims 10 and 12 is respectfully requested.

The Examiner rejects claims 14, 15 and 16 under 35 U.S.C. §103(a) as being unpatentable over Benmohamed in view of Debey.

Claim 15 is directed to a transmission medium transmitting a communication network design control program for designing a communication network for multiple point communication service for permitting arbitrary communication within a predetermined range by providing traffic flowing in from an ingress node through which data flows in from an other network and traffic flows out from an egress node through which data is fed to the other network the communication network design control program including setting a mathematical programming problem for deriving the multiple point communication service to provide arbitrary communication within the predetermined range, the setting including setting a constraint

expression for deriving the link load, generating a constraint expression for calculating a necessary link bandwidth of each link carrying traffic flowing in from each ingress node, and generating a constraint expression so as not to exceed a link capacity limit in each link; solving the mathematical programming problem set in the setting; and obtaining a path for the multiple point communication service. Benmohamed and Debey, alone or in any reasonable combination, do not disclose or suggest at least one of these features.

For example, Benmohamed and Debey, alone or in any reasonable combination, do not disclose or suggest setting a mathematical programming problem for deriving the multiple point communication service to provide arbitrary communication within the predetermined range, as required by claim 15, for at least the reasons given above with respect to claims 3, 7, and 11. Moreover, the disclosure of Debey does not cure the defects in the disclosure of Benmohamed with respect to setting a mathematical programming problem for deriving the multiple point communication service to provide arbitrary communication within the predetermined range, as required by claim 15.

Since Benmohamed and Debey, alone or in any reasonable combination, do not disclose or suggest the features of claim 15, the 35 U.S.C. §103(a) rejection of claim 15 is improper. Applicant respectfully requests that the 35 U.S.C. §103(a) rejection of claim 15 be reconsidered and withdrawn.

Claims 14 and 16 depend from claim 15 and are believed allowable for at least the reasons presented with respect to the 35 U.S.C. §103(a) rejection of claim 15. Reconsideration and withdrawal of the 35 U.S.C. §103(a) rejection of claims 14 and 16 is respectfully requested.

CONCLUSION

In view of the foregoing amendment and remarks, Applicant respectfully requests the Examiner's reconsideration of this application, and the timely allowance of the pending claims.

As Applicant's remarks with respect to the Examiner's rejections are sufficient to overcome these rejections, Applicant's silence as to certain assertions by the Examiner in the Office Action or certain requirements that may be applicable to such rejections (e.g., whether a reference constitutes prior art, motivation to combine references, etc.) is not a concession by Applicant that such assertions are accurate or such requirements have been met, and Applicant reserves the right to analyze and dispute these assertions/requirements in the future.

To the extent necessary, a petition for an extension of time under 37 C.F.R. §1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-1070 and please credit any excess fees to such deposit account.

Respectfully submitted,

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